# USER'S MANUAL

## AXIS P5522–E PTZ Dome Network Camera

## About this document

This manual is intended for administrators and users of the AXIS P5522–E PTZ Dome Network Camera, and is applicable to firmware 5.25 and later. It includes instructions for using and managing the product on your network. Previous experience of networking will be of use when using this product. Some knowledge of UNIX or Linux-based systems may also be beneficial, for developing shell scripts and applications. Later version of this document will be posted to the Axis website, as required. See also the product's online help, available via the web-based interface.

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This product contains licensed third-party software. See the menu item "About" in the product's user interface for more information.

This product contains source code copyright Apple Computer, Inc., under the terms of Apple Public Source License 2.0 (see http://www.opensource.apple.com/apsl). The source code is available from http://developer.apple.com/darwin/projects/bonjour/

## Equipment Modifications

This equipment must be installed and used in strict accordance with the instructions given in the user documentation. This equipment contains no user-serviceable components. Unauthorized equipment changes or modifications will invalidate all applicable regulatory certifications and approvals.

## Trademark Acknowledgments

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## Support

Should you require any technical assistance, please contact your Axis reseller. If your questions cannot be answered immediately, your reseller will forward your queries through the appropriate channels to ensure a rapid response. If you are connected to the Internet, you can:

- download user documentation and software updates
- find answers to resolved problems in the FAQ database. Search by product, category, or phrase
- report problems to Axis support staff by logging in to your private support area
- chat with Axis support staff (selected countries only)
- visit Axis Support at www.axis.com/techsup/

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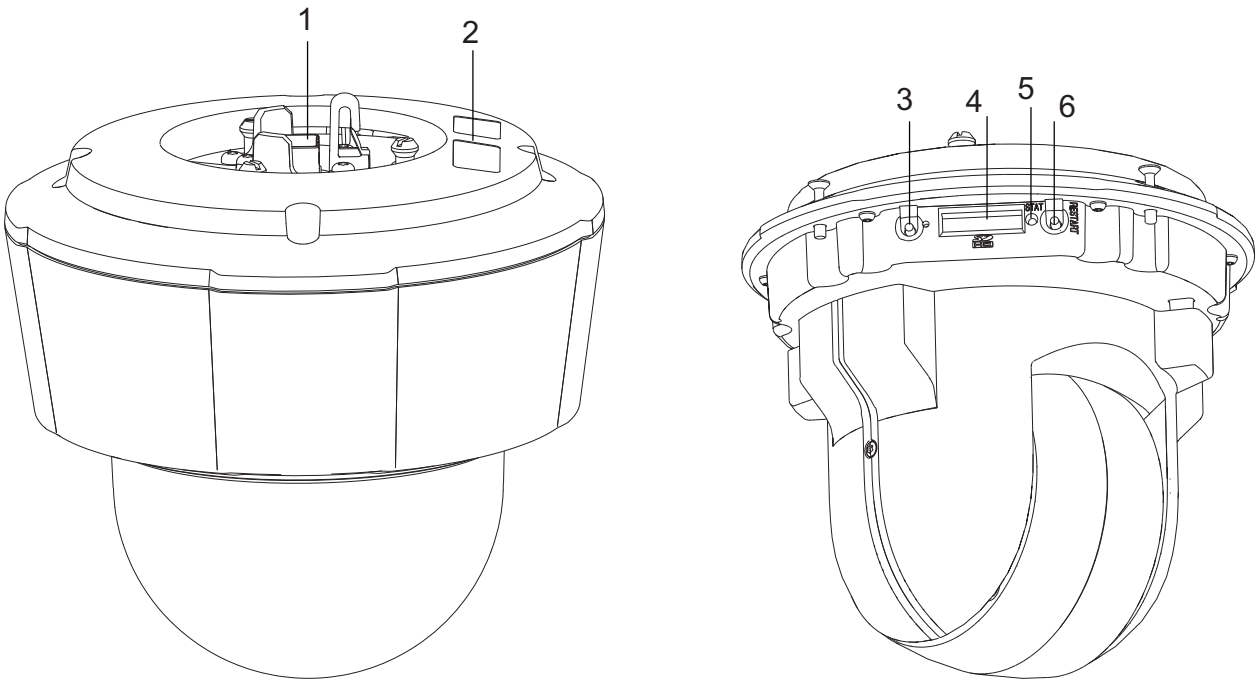
# Hardware overview

## Hardware overview




1. *Network connector*
2. *Part number (P/N) & Serial number (S/N). Serial number may be required during installation.*
3. *Control button*
4. *SDHC card slot*
5. *Status indicator LED*
6. *Restart button*

## Connectors

**Network connector –** RJ-45 Ethernet connector. Supports High Power over Ethernet (High PoE). Use the supplied midspan.

**Caution**

To protect the product against power surges, a shielded network cable (STP) must be used between the product and the midspan. Ensure that the midspan is properly grounded.

**Control button –** The control button is used for:

- Connecting to an AXIS Video Hosting System service, see *page 33*. To connect, press and hold the button until the Status LED flashes green.
- Connecting to AXIS Internet Dynamic DNS Service, see *page 34*. To connect, press the button once.
- Restoring the product to factory default settings, see *page 39*.

**Restart button –** Press to restart the product.

**SDHC Memory card slot –** A standard or high-capacity SD memory card (not included) can be used for local recording with removable storage. For instructions on how to insert and remove an SD card, please refer to the Installation Guide.

## Hardware overview

Note

Before removal, the SD card should be unmounted to prevent corruption of recordings. To unmount the SD card, go to **Setup > System Options > Storage > SD Card** and click **Unmount**.

### LED indicators

| Color | Indication |
|---|---|
| Unlit | Connection and normal operation |
| Amber | Steady during system initialization and reset to factory default. Flashes during firmware upgrade. |
| Amber/red | Flashes amber/red if network connection is unavailable or lost. |
| Red | Flashes red for firmware upgrade failure. |
| Green | Shows steady green for 10 seconds for normal operation after restart. |

# Accessing the product

## Accessing the product

To install the Axis product, refer to the Installation Guide supplied with the product.

The product can be used with most operating systems and browsers. The recommended browsers are Internet Explorer with Windows, Safari with Macintosh and Firefox with other operating systems. See *Technical Specifications, on page 45*.

Note

- To view streaming video in Internet Explorer, allow installation of AXIS Media Control (AMC) when prompted.
- QuickTime™ is also supported for viewing H.264 streams.
- If your computer restricts the use of additional software components, the product can be configured to use a Java applet for viewing Motion JPEG.
- The Axis product includes one (1) H.264 decoder license for viewing video streams. The license is automatically installed with AMC. The administrator can disable the installation of the decoders, to prevent installation of unlicensed copies.

### Access from a browser

1. Start a browser (Internet Explorer, Firefox, Safari).
2. Enter the IP address or host name of the Axis product in the browser's Location/Address field. To access the product from a Macintosh computer (Mac OS X), click on the Bonjour tab and select the product from the drop-down list.

   If you do not know the IP address, use AXIS IP Utility to locate the product on the network. For more information on how to discover and assign an IP address, refer to the Installation Guide.
3. Enter your user name and password. If this is the first time the product is accessed, the root password must first be configured; for instructions see *Set the root password, on page 7*.
4. The product's Live View page appears in your browser.

Note

The layout of the Live View page may have been customized to specific requirements. Consequently, some of the examples and functions featured here may differ from those displayed in your own Live View page.

### Access from the Internet

Once connected, the Axis product is accessible on your local network (LAN). To access the product from the Internet you must configure your network router to allow incoming data traffic to the product. To do this, enable the NAT-traversal feature, which will attempt to automatically configure the router to allow access to the product. This is enabled from **Setup > System Options > Network > TCP/IP Advanced.**

# Accessing the product

For more information, please see *NAT traversal (port mapping) for IPv4, on page 35*. See also AXIS Internet Dynamic DNS Service at www.axiscam.net For Technical notes on this and other topics, visit the Axis Support web at www.axis.com\techsup

## Set the root password

To gain access to the Axis product, you must set the password for the default administrator user **root**. This is done in the **Configure Root Password** dialog, which appears when the product is accessed for the first time.

To prevent network eavesdropping, the root password can be set via an encrypted HTTPS connection, which requires an HTTPS certificate. HTTPS (Hypertext Transfer Protocol over SSL) is a protocol used to encrypt traffic between web browsers and servers. The HTTPS certificate ensures encrypted exchange of information.

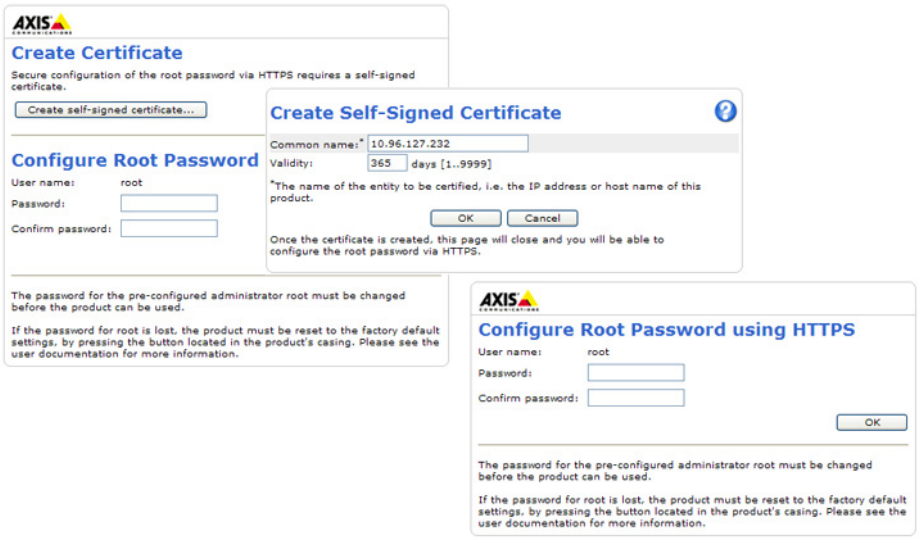
To set the password via a standard HTTP connection, enter it directly in the first dialog.

To set the password via an encrypted HTTPS connection, follow these steps:

1. Click **Create self-signed certificate**.
2. Provide the requested information and click **OK**. The certificate is created and the password can now be set securely. All traffic to and from the product is encrypted from this point on.
3. Enter a password and then re-enter to confirm the spelling. Click **OK**. The password has now been configured.

Note

- The default administrator user name **root** is permanent and cannot be deleted.
- If the password for root is lost, the product must be reset to the factory default settings. See *Reset to factory default settings, on page 39*.




## The Live View page

If the Axis product has been customized to meet specific requirements, not all the items described below will appear in the Live View page. The following provides an overview of each available button.

# Accessing the product

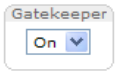
## Controls on the Live View page

The **Stream Profile** drop-down list allows you to select a customized or pre-programmed stream profile. Stream profiles are configured under **Video > Stream Profiles**. See *Stream Profiles, on page 15*.

The **Manual Trigger** button can trigger an event directly from the Live View page. The button is configured under **Live View Config > Action Buttons**.

Click **Snapshot** to save a snapshot of the video image. Right-click the video image to save it in JPEG format on your computer. This button is primarily intended for use when the AXIS Media Control viewer toolbar is not available. Enable this button from **Live View Config > Action Buttons.**

Activate the product's fan with this button. Enable this button from **Live View Config > Action Buttons.**




Enable or disable the **Gatekeeper** by selecting On or Off from the drop-down list. The Gatekeeper is configured under **Setup > Events > Gatekeeper**, see *page 26*.

## AXIS Media Control viewer toolbar

The AXIS Media Control viewer toolbar is available in Internet Explorer only. See *AXIS Media Control (AMC), on page 10* for more information. The toolbar displays the following buttons:

The **Play** button connects to the Axis product and starts playing a media stream.

The **Stop** button stops the video stream.

The **Snapshot** button takes a snapshot of the video image. The location where the image is saved can be specified in the AMC Control Panel.

Click the **View Full Screen** button and the video image will fill the entire screen. Press ESC (Escape) on the computer keyboard to cancel full screen view.

The **Record** button is used to record the current video stream. The location where the recording is saved can be specified in the AMC Control Panel.

## PTZ Controls

The Live View page also displays Pan/Tilt/Zoom (PTZ) controls. The administrator can enable/disable controls for specified users under **System Options > Security > Users**.

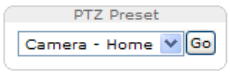
With the **PTZ Control Queue** enabled the time each user is in control of the PTZ settings is limited. Click the buttons to request or release control of the PTZ controls. The PTZ Control Queue is set up under **PTZ > Control Queue**.

Click the **Emulate joystick mode** button and click in the image to move the camera view in the direction of the mouse pointer.

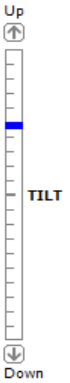
Click the **Center mode** button and click in the image to center the camera view on that position.

## Accessing the product

Click the **Ctrl panel** button to open the PTZ control panel which provides additional PTZ controls. User-defined buttons can also appear in the Control panel. See *Controls, on page 21*.




Select a PTZ preset position to steer the camera view to the saved position. See *Preset positions, on page 20*.

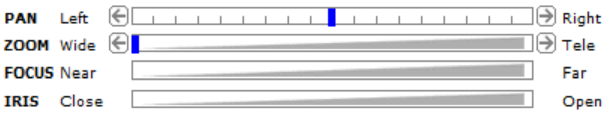



**Pan and Tilt bars** – Use the arrows to pan and tilt the camera view, or click on a position on the bar to steer the camera view to that position.

**Zoom bar** – Use the arrows to zoom in and out, or click on a position on the bar to zoom to that position.

**Focus bar** – Click on a position on the focus bar to set the focus position. This will disable the product's autofocus. To re-enable, use the PTZ control panel which is opened by clicking the **Ctrl panel** button (see above).

**Iris bar** – Click on a position on the iris bar to change the degree to which the iris is opened. This will disable the product's auto iris. To re-enable, use the PTZ control panel which is opened by clicking the **Ctrl panel** button (see above).




The PTZ controls can be disabled under **PTZ > Advanced > Controls**, see *Controls, on page 21*.

# Media streams

## Media streams

The Axis product provides several image and video stream formats. Your requirements and the properties of your network will determine the type you use.

The Live View page in the product provides access to H.264 and Motion JPEG video streams, and to the list of available stream profiles. Other applications and clients can access video streams directly, without going via the Live View page.

### How to stream H.264

The video compression standard H.264 makes good use of bandwidth, and can provide high quality video streams at less than 1 Mbit/s.

Deciding which combination of protocols and methods to use depends on your viewing requirements, and on the properties of your network. The available options in AXIS Media Control are:

<table>
<tr><td>Unicast RTP</td><td>This unicast method (RTP over UDP) is used for live unicast video, especially when it is important to always have an up-to-date video stream, even if some images are dropped.</td><td rowspan="3">Unicasting is used for video-on-demand transmission so that there is no video traffic on the network until a client connects and requests the stream.<br>Note that there are a maximum of 20 simultaneous unicast connections.</td></tr>
<tr><td>RTP over RTSP</td><td>This unicast method (RTP tunneled over RTSP) is useful as it is relatively simple to configure firewalls to allow RTSP traffic.</td></tr>
<tr><td>RTP over RTSP over HTTP</td><td>This unicast method can be used to traverse firewalls. Firewalls are commonly configured to allow the HTTP protocol, thus allowing RTP to be tunneled.</td></tr>
<tr><td>Multicast RTP</td><td colspan="2">This method (RTP over UDP) should be used for live multicast video. The video stream is always up-to-date, even if some images are dropped.<br>Multicasting provides the most efficient usage of bandwidth when there are large numbers of clients viewing simultaneously. A multicast cannot however, pass a network router unless the router is configured to allow this. It is not possible to multicast over the Internet, for example.<br>Note also that all multicast viewers count as one unicast viewer in the maximum total of 20 simultaneous connections.</td></tr>
</table>

AXIS Media Control negotiates with the Axis product to determine the transport protocol to use. The order of priority, listed in the AMC Control Panel, can be changed and the options disabled, to suit specific requirements.

Note

H.264 is licensed technology. The Axis product includes one H.264 viewing client license. Installing additional unlicensed copies of the clients is prohibited. To purchase additional licenses, contact your Axis reseller.

### MJPEG

This format uses standard JPEG still images for the video stream. These images are then displayed and updated at a rate sufficient to create a stream that shows constantly updated motion.

The Motion JPEG stream uses considerable amounts of bandwidth, but provides excellent image quality and access to every image contained in the stream. The recommended method of accessing Motion JPEG live video from the Axis product is to use the AXIS Media Control in Internet Explorer in Windows.

### AXIS Media Control (AMC)

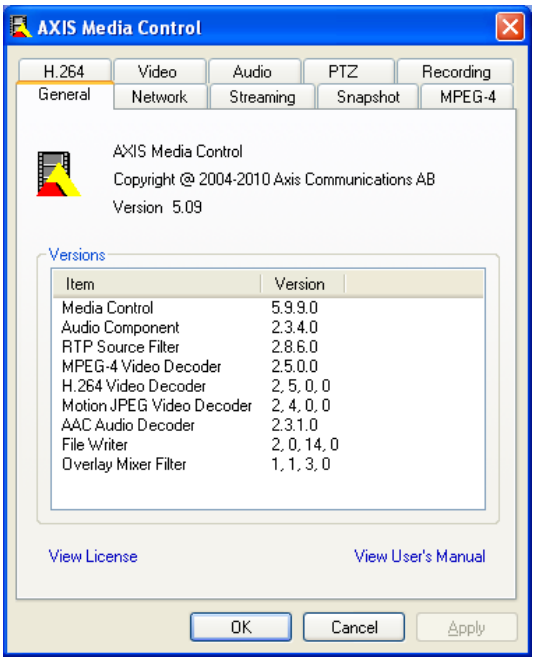
AXIS Media Control (AMC) in Internet Explorer in Windows is the recommended method of accessing live video from the Axis product.

## Media streams

The AMC Control Panel can be used to configure various video settings. Please see the AXIS Media Control User's Manual for more information.

The AMC Control Panel is automatically installed on first use, after which it can be configured. Open the AMC Control Panel from:

- Windows Control Panel (from the Start menu)
- Alternatively, right-click the video image in Internet Explorer and click **Settings**.




## Alternative methods of accessing the video stream

You can also access video and images from the Axis product in the following ways:

- **Motion JPEG server push** (if supported by the client, Firefox, for example). This option maintains an open HTTP connection to the browser and sends data as and when required, for as long as required.
- **Still JPEG images in a browser**. Enter the path `http://<ip>/axis-cgi/jpg/image.cgi`
- **Windows Media Player**. This requires AXIS Media Control and the H.264 decoder to be installed. The following paths can be used:
  - Unicast via RTP: `axrtpu://<ip>/axis-media/media.amp`
  - Unicast via RTSP: `axrtsp://<ip>/axis-media/media.amp`
  - Unicast via RTSP, tunneled via HTTP: `axrtsphttp://<ip>/axis-media/media.amp`
  - Multicast: `axrtpm://<ip>/axis-media/media.amp`
- **QuickTime™**. The following paths can be used:
  - `rtsp://<ip>/axis-media/media.amp`
  - `rtsp://<ip>/axis-media/media.3gp`

## Media streams

Note

- <ip>= IP addess
- The Axis product supports QuickTime 6.5.1 and later.
- QuickTime adds latency to the video stream (up to 3 seconds).
- It may be possible to use other players to view the H.264 stream using the paths above, although Axis does not guarantee this.

# Setting up the product

## Setting up the product

The Axis product can be configured by users with administrator or operator rights. Click **Setup** in the top right-hand corner of the Live View page.

- **Administrators** have unrestricted access to all settings.
- **Operators** have access to all settings except System Options

See also the online help .

## Basic Setup

Basic Setup provides shortcuts to the settings that should be made before using the Axis product:

1. Users, see *page 31*.
2. TCP/IP, see *page 33*.
3. Date & Time, see *page 32*.
4. Video Stream, see *page 14*.

# Video

## Video

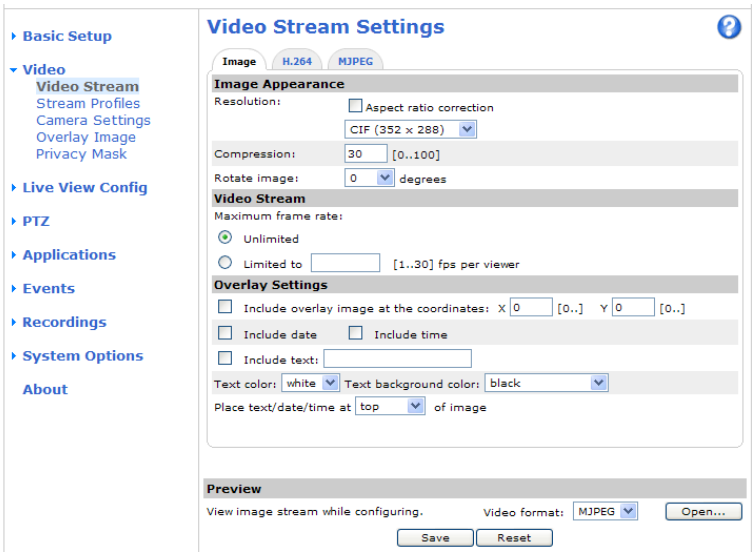
It is possible to configure the following video features in your Axis product:

- Video stream. See *page 14*.
- Stream profiles. See *page 15*.
- Camera settings. See *page 15*.
- Overlay image. See *page 17*.
- Privacy mask. See *page 17*.

## Video Stream

You can define the following video stream settings from **Video** > **Video Stream**:

- Image. See *page 14*.
- H.264. See *page 15*.
- MJPEG. See *page 15*.




### Image

You can modify the image resolution and compression, and rotate the image from the **Image** tab (**Video** > **Video Stream**). Setting the compression level affects the image quality and bandwidth; the lower the compression, the higher the image quality with higher bandwidth requirements.

To avoid bandwidth problems on the network, you can limit the frame rate allowed to each viewer. The maximum frame rate can be set to **Unlimited**, or you can limit the frame rate to a value.

You can also have an image or text superimposed over the image as overlay. See *Overlay, on page 17*.

You must save your settings before they can take effect.

# Video

### H.264

The GOV structure describes the composition of the video stream and setting the GOV-length to a higher value saves considerably on bandwidth but may have an adverse effect on image quality.

The bit rate can be set as **Variable Bit Rate** (VBR) or **Constant Bit Rate** (CBR). VBR adjusts the bit rate according to the image complexity, using up more bandwidth for increased activity in the image, and less for lower activity in the monitored area. CBR allows you to set a fixed **Target bit rate** that consumes a predictable amount of bandwidth. As the bit rate would usually need to increase for increased image activity, but in this case cannot, the frame rate and image quality are affected negatively. To partly compensate for this, it is possible to prioritize either the frame rate or the image quality. Not setting a priority means the frame rate and image quality are equally affected. You must save your settings before they can take effect.

The current bit rate can be set to appear as text overlay. To do this, select the **Include text** check box option under **Overlay Settings** and enter the code #b in the field.

### MJPEG

Sometimes the image size is large due to low light or complex scenery. Adjusting the maximum frame size helps to control the bandwidth and storage used by the Motion JPEG video stream in these situations. Setting the frame size to the **Default** setting provides consistently good image quality at the expense of increased bandwidth and storage usage in low light. Limiting the frame size optimizes bandwidth and storage usage, but may give poor image quality. To prevent increased bandwidth and storage usage, the maximum frame size should be set to an optimal value.

## Stream Profiles

There are four pre-programmed stream profiles available for quick set up. The settings for these can be adjusted. New customized profiles can also be created. Each profile has a descriptive name, indicating its purpose.

- The stream profiles can be accessed from the **Stream profile** drop-down list in the Live View page.
- To add, copy, modify, and remove stream profiles go to **Video** > **Stream Profiles**.
- To select the default stream profile go to **Live View Config** > **Stream Profile** and choose the profile from the drop-down list.

For more information see the online help on this page.

## Camera Settings

The **Video** > **Camera Settings** page provides access to advanced image settings for the Axis product.

### Image Appearance

**Brightness –** The image brightness can be adjusted in the range 0–100, where a higher value produces a brighter image.

**Sharpness –** Controls the amount of sharpening applied to the image. A sharper image might increase image noise especially in low light conditions. A lower setting reduces image noise, but the whole image will appear less sharp. Increasing the sharpness can increase bandwidth usage.

#### IR cut filter

The IR cut filter prevents infrared (IR) light from reaching the image sensor. In poor lighting conditions, for example at night, or when using an IR lamp, set the IR cut filter to **Off**. This increases light sensitivity and allows the product to "see" infrared light. The image is shown in black and white when the IR cut filter is off.

If using automatic **Exposure control**, set the IR cut filter to **Auto** to automatically switch between **On** and **Off** according to the lighting conditions.

# Video

## White balance

White balance is used to make colors in the image appear the same regardless of the color temperature of the light source. The Axis product can be set to automatically identify the light source and compensate for its color. Alternatively, select the type of light source from the drop-down list. For a description of each available setting, see the online help.

## Wide Dynamic Range

Wide dynamic range can improve the exposure when there is a considerable contrast between light and dark areas in the image.

## Exposure Settings

Configure the exposure settings to suit the image quality requirements in relation to lighting, frame rate and bandwidth considerations.

Select **Enable Backlight compensation** if a bright spot of light, for example a light bulb, causes other areas in the image to appear too dark.

The **Exposure control** setting is used to adapt to the amount of light used. Select one of the following modes:

- **Auto** is the default settings and can be used in most situations. Shutter speed, Iris and Gain are automatically set to produce optimum image appearance for different lighting situations.
- **Manual Shutter** allows you to manually adjust the shutter speed. Iris and Gain are set automatically.
- **Manual Iris** allows you to manually adjust the iris opening in the lens. Shutter speed and Gain are set automatically.
- **Manual** allows you to manually adjust Shutter speed, Iris and Gain.

**Shutter speed –** A slower speed in dark conditions will help to produce a brighter image, but will produce fewer frames per second, which may cause blurry images during motion.

**Iris –** A larger F-value means less light sensitivity, but a larger depth of field.

**Gain –** Measured in decibels (dB), gain describes the amount of amplification applied to a signal, in this case the visual information in the image. A high level of amplification may provide a better image in very low light situations. A high gain will also increase the amount of image noise.

**Max exposure time –** Increasing the exposure time will improve image quality, but decrease the frame rate. There may also be an increase in motion blur.

**Max gain –** Max gain limits the amount of gain that can be applied to the image in Exposure control modes with automatic gain adjustment.

**Exposure zones –** This settings determines which part of the image is used to calculate the exposure. For most situations, the **Auto** setting can be used. For particular requirement, select a predefined area.

## Image settings

**Autofocus enabled –** Automatic focusing is enabled by default. If the focus position is changed manually using the focus bar, autofocus will be disabled even if enabled here. In this case, use the PTZ control panel to enable autofocus, see *PTZ Controls, on page 8*. If required, the focus control can be disabled under **PTZ > Advanced > Controls**.

**Noise reduction –** Set to **On** to enable noise reduction. Noise reduction may increase the amount of motion blur.

**Image freeze on PTZ –** Select **All movements** to freeze the image while the camera is moving during a pan, tilt or zoom operation. Once the camera reaches its new position, the view from that position is shown. **Presets** freezes the image only when the camera moves between preset positions.

# Video

## Overlay

An overlay can be text or an image superimposed over the video image. The overlay image can be used to provide extra information, or to mask a part of the video image. See the online help for supported image formats and sizes.

To use your own image, such as a logo, first upload the image to the Axis product. Go to **Video** > **Overlay Image**, browse for and upload the image file on the computer. The file can then be selected from the **Use overlay image** drop-down list.

To place an overlay image at specific coordinates, go to **Video** > **Video Stream** and select the **Include overlay image at coordinates** check box option and enter the X and Y coordinates.

As text overlay it is possible to include the name of the OSDI zone, see *OSDI Zones, on page 21*; to view the current bit rate as overlay text, go to **Video** > **Video Stream** > **Overlay Settings**, select the **Include text** check box option, and enter the code #b in the field.

For more information see the online help

## Privacy Mask

A privacy mask is an area of solid color that prohibits users from viewing parts of the monitored area. It is possible to use up to eight privacy masks. Privacy masks cannot be bypassed via the VAPIX® Application Programming Interface (API).

The Privacy Mask List (**Video** > **Privacy Mask**) shows all the masks that are currently configured in the Axis product and indicates if they are enabled.

You can add a new mask, re-size the mask with the mouse, choose a color for the mask, and give the mask a name.

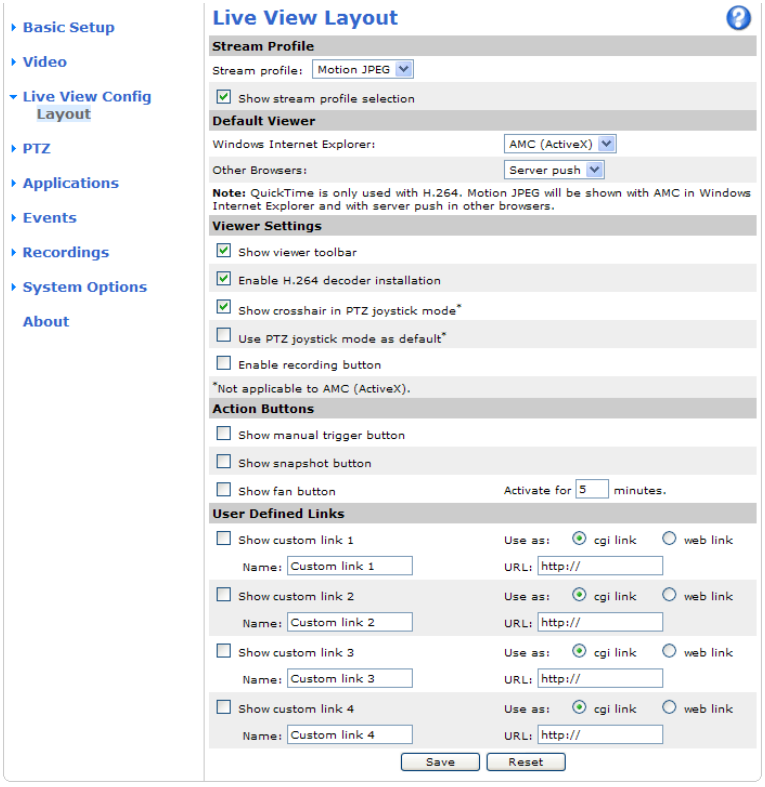
For more information, see the online help

# Live View Config

## Live View Config

You can customize the Live View page and alter it to suit your requirements. It is possible to define the following features of the Live View page.

- Stream Profile. See *page 15*.
- Default Viewer for Browser. See *page 18*.
- Viewer Settings. See *page 19*.
- Action Buttons. These are the buttons described in *Controls on the Live View page, on page 8* .
- User Defined Links. See *page 19*.




### Default viewer for browsers

From **Live View Config** > **Default Viewer** select the default method for viewing video images in your browser. The product attempts to show the video images in the selected video format and viewer. If this is not possible, the product overrides the settings and selects the best available combination.

## Live View Config

| Browser | Viewer | Description |
|---|---|---|
| Windows Internet Explorer | AMC | Recommended viewer in Internet Explorer (H.264/Motion JPEG) |
| | QuickTime | H.264 |
| | Java applet | A slower imaging alternative to AMC. Requires one of the following installed on the client:<br>• JVM (J2SE) 1.4.2 or higher<br>• JRE (J2SE) 5.0 or higher |
| | Still image | Displays still images only. Click the Refresh button in your browser to view a new image |
| Other browsers | Server Push | Recommended viewer for other browsers (Motion JPEG). |
| | QuickTime | H.264 |
| | Java applet | A slower imaging alternative to Server Push (Motion JPEG only). |
| | Still image | Displays still images only. Click the Refresh button in your browser to view a new image |

For more information, please see the online help .

### Viewer Settings

Options for the viewer are configured under **Live View Config** > **Viewer Settings**.

- The **Show viewer toolbar** option will display the AXIS Media Control (AMC) or the QuickTime viewer toolbar under the video image in your browser.
- H.264 decoder installation. The administrator can disable installation of the H.264 decoder included with AXIS Media Control. This is used to prevent installation of unlicensed copies. Further decoder licenses can be purchased from your Axis reseller.
- Select **Show crosshair in PTZ joystick mode** to enable a cross that will indicate the center of the image in PTZ joystick mode.
- Select **Use PTZ joystick mode as default** to enable joystick mode. The mode can be changed temporarily from the PTZ control panel.
- You can enable recording from the Live View page. The recordings are saved to the location specified in the AMC Control Panel. See *AXIS Media Control (AMC), on page 10*.

### User Defined Links

To display user-defined links in the Live View page, select the **Show custom link** option, give the link a name and then enter the URL to link to. When defining a web link do not remove the 'http://' from the URL address. Custom links can be used to run scripts or activate external devices connected to the product, or they can link to a web page. Custom links defined as cgi links will run the script in the background, in a hidden frame. Defining the link as a web link will open the link in a new window.

# PTZ (Pan Tilt Zoom)

## PTZ (Pan Tilt Zoom)

### Preset positions

A preset position is a predefined view that can be used to quickly steer the camera to a specific location.

To add a preset position:

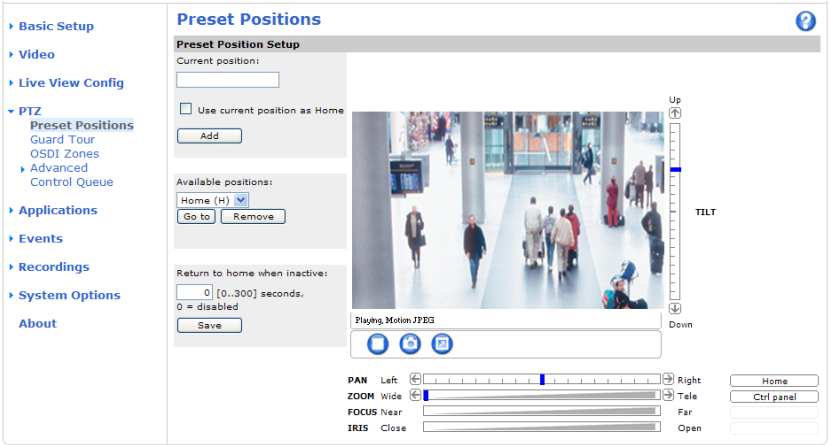
1. Go to **PTZ > Preset Positions**.
2. Use the pan, tilt and zoom controls to steer the camera view to the desired position.
3. Enter a descriptive name in the **Current position** field.
4. If required, select **Use current position as Home**.
5. Click **Add**. The camera's position, iris and focus settings are saved as a preset position.

The position can be assumed at any time by selecting the preset from the Preset positions drop-down list in the Live View page, and when setting up Events, Guard Tours and the Gatekeeper. The **Home** position is readily accessible by clicking the **Home** button on the Live View page and in the Preset Positions setup window.

To set a customized home position, select **Use current position as Home** when adding a preset position. The user-defined home position will have (H) added, for example, Entrance (H). The default Home position, called "Home", will still be available.

The product can be configured to return to the Home position when it has been inactive for a specified length of time. Enter the length of time in the **Return to home when inactive** field and click **Save**. Set the time to zero to prevent the product from automatically returning to the Home position.

To include the preset position name in the overlay text, go to **Video**, select **Include overlay text** and enter the modifier `#P` in the field. For more information about modifiers, see *File Naming & Date/Time Formats* in the online help.




### Guard Tour

A guard tour displays the video stream from different preset positions, one-by-one, in a predetermined order or at random and for configurable time periods. The guard tour will keep running after the user has logged off or closed the browser.

To add, remove and modify guard tours, go to **PTZ > Guard Tour**. For more information see the online help.

Note

The pause between guard tour runs must be set to at least 10 minutes.

# PTZ (Pan Tilt Zoom)

## OSDI Zones

On-Screen Direction Indicator (OSDI) zones can be included in the overlay text (see *Overlay, on page 17*) to aid the user to navigate the Axis product. Each OSDI zone is set up with coordinates and a descriptive name.

OSDI zones are set up under **PTZ > OSDI Zones**. The Axis product uses the coordinates of the center of the view to set the lower left and upper right zone areas. First navigate to where you would like the lowermost left point of the OSDI zone to be located. Click **Get** to set the coordinates. Proceed to where the upper right point of zone should be located and click **Get**. Give the zone a descriptive name and click **OK**.

To include the name of the OSDI zone in the overlay text, go to **Video** < **Video Stream** < **Overlay Settings**. Check the **Include text** box and enter the modifier **#L** in the field. For more information about modifiers, see *File Naming & Date/Time Formats* in the online help .

## Advanced

### Limits

Define the pan, tilt, zoom and focus limits for the Axis product. Movements to the left and right, up and down, can be restricted to narrow the area under surveillance. The near focus limit can be set to avoid focusing on objects too close to the camera lens.

**Move speed** sets the speed of the camera's pan and tilt movements. The default setting is maximum speed.

When using a joystick (or emulating one with the mouse) the **Enable proportional speed** setting can be used to reduce the maximum pan/tilt movement speed, i.e. the speed the camera view moves at when the joystick is pushed all the way out in any direction. This is useful then the view is zoomed in on an object.

When **Enable Auto-flip** is selected, the Axis product will simulate continuous pan movement in the same direction, i.e. the camera will pan the full 360 degrees, even though there is a mechanical stop at ±180 degrees.

When **Enable movement prediction** is selected, the Axis product will attempt to predict the new position in the pan movement, after compensating for the slight delay while the camera changes direction after an auto-flip. This is useful for tracking moving objects or persons when using the joystick or emulated joystick mode.

See the online help for more information.

### Controls

**Panel Shortcut Command Buttons** can be configured to provide direct access to commands issued via the VAPIX® Application Programming Interface. The buttons will be displayed in the PTZ control panel, which is available in the Live View page though the **Ctrl panel** button, see *page 8*.

Deselect the options under **Enable/Disable controls** to disable the pan, tilt, zoom, focus and iris controls.

Note

Disabling PTZ controls will affect preset positions. For example, if the tilt control is disabled, the product cannot move to preset positions that require a tilt movement.

## Control Queue

The administrator can set up a queue for PTZ controllers from **PTZ > Control Queue**. Once set up, the **PTZ Control Queue** buttons appear in the Live View page offering one viewer exclusive control for a limited period of time. Other users will be placed in queue.

A user who belongs to a group (see *Users, on page 31*) with a higher PTZ priority can go before other users in the queue and take control of the product. The order of priority is as follows:

1. **Administrator** – An administrator takes over PTZ control regardless of who is first in queue. The administrator will be removed from the queue 60 seconds after the last PTZ control command.

## PTZ (Pan Tilt Zoom)

2. **Event** – The Axis product can be configured to go to a preset position when triggered by an alarm (see *Events, on page 24*). The event will immediately be placed first in the queue except when an administrator is in control.
3. **Operator** – Same as administrator but with lower priority
4. **Guard Tour** – A guard tour (see *page 20*) has PTZ control for an indefinite period of time. It may be overridden by an operator, event or administrator. The guard tour will resume when higher priority groups leave the queue.
5. **Viewer** – Multiple viewers must wait for their turn. The viewer has 60 seconds PTZ control before control is passed on to the next viewer in queue.

Note

- The administrator can enable and disable PTZ controls for selected users.
- To identify different users in the viewer group, cookies must be enabled on the client.

# Applications

## Applications

Third party applications can be uploaded to and installed on the Axis product. For more information, go to www.axis.com/applications

To upload an application, go to **Applications > Packages**, click **Browse** to locate the file and then click **Upload Package**. Click on the uploaded application's name to open the menu options **Settings**, **License** and **About**. For configuration instructions, please refer to the documentation provided with the application.

Most applications need a **license** to run. To install the license, select the **License** menu option. If the product is connected to the Internet, **Automatic Installation** appears in the web page. If the product is not connected to the Internet, go to www.axis.com/applications to acquire a License key. You will need a license code and the product's serial number (found on the label and under **System Options > Support > System Overview**) to receive a license key.

**Installed Applications** lists installed applications with information about the version and the vendor, the status of the application (running or not running), and information about the license.

Use the **Start** and **Stop** buttons to start and stop the application.

To generate a log file for the application, select the application and click **Log**.

Note

It is recommended to run one application at a time. Avoid running applications when motion detection is active.

# Events

## Events

Predefined parameters, known as an **Event** or **Event Type**, can trigger actions in the Axis product. A common event type is an alarm that causes the product to upload images to an **Event Server**.

**Triggered events –** are activated by a signal, for example motion detection.

**Scheduled events –** run at preset times, in a repeating pattern on selected weekdays.

**Actions –** refer to what happens when an event occurs.

Triggered events can be activated by:

- Motion detection, see *page 26*
- A trigger from an uploaded application, see *Applications, on page 23*
- Pan Tilt Zoom — when the view stops at a preset position
- Full disk — when the SD card has less than 1 MB free memory left
- System events, for example on boot.

Event actions include:

- Uploading images to an event server or send images by email
- Saving the video stream to the product's SD card
- Sending notification messages and emails
- Pan Tilt Zoom — go to a preset or run a guard tour

## Event Servers

Event servers receive uploaded image files and/or notification messages. To set up event server connections in the Axis product, go to **Events > Event Servers** and enter the required information for the server type.

Note

Email servers are configured under **System Options > Network > SMTP (email)**.

When the setup is complete, click **Test** to test the connection (the connection test takes approximately 10 seconds).

| Server type | Purpose | Information required |
|---|---|---|
| FTP Server | • Receives uploaded images | • Descriptive name<br>• Network address and upload path<br>• User name and password |
| HTTP Server | • Receives notification messages<br>• Receives uploaded images | • Descriptive name<br>• URL (IP address or host name)<br>• User name and password<br>• Proxy settings |
| TCP Server | • Receives notification messages | • Descriptive name<br>• Network address (IP address or host name)<br>• Port number |

For details on each settings, see the online help .

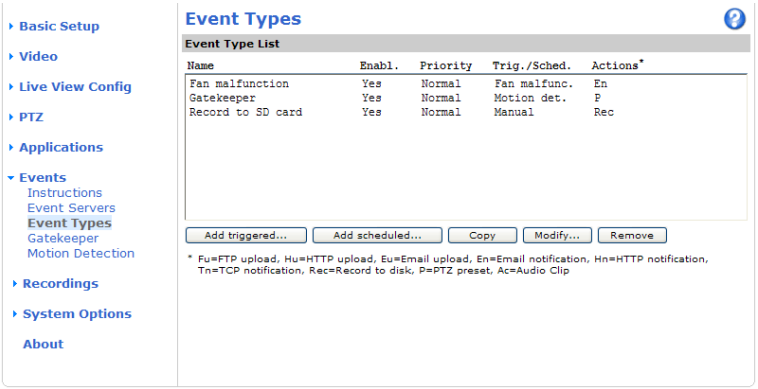
# Events

## Event Types

An **Event Type** describes how and when the Axis product performs certain actions.

Example

If somebody passes in front of the camera and an event has been configured to detect and respond to motion, the Axis product can record and save images to an FTP server and send a notification email. Images can be sent as email attachments.




### Set up a triggered event

The following example describes how to configure the Axis product to upload images when motion is detected.

1. Go to **Events > Motion Detection** and set up a motion detection window. See *Set up motion detection, on page 27*.
2. Go to **Events > Event Types** and click **Add triggered**.
3. Enter a descriptive name for the event, for example Motion detected.
4. Set the **Priority** — high, normal or low.
5. Set the **Respond to Trigger** parameters to define when the event is active, for example, after office hours.
6. Select Motion detection from the **Triggered By** list. Select the desired motion detection window and indicate if the event should be triggered when motion starts or stops (or both).
7. Set the **When Triggered** parameters, that is, define what the product should do when motion is detected. To upload images, select **Save stream** and enter the required information. See *Save stream*.
8. Click **OK** to save the event.

Note

- Up to 10 event types can be configured, and up to 3 of these can be configured to upload images.
- File names can be formatted according to specific requirements. See *File Naming & Date/Time Formats* in the online help.

### Set up a scheduled event

A scheduled event can be activated at preset times, in a repeating pattern on selected weekdays.

The following example describes how to configure the Axis product to upload images from pre-programmed time periods.

1. Go to **Events > Event Types** and click **Add scheduled**.
2. Enter a descriptive name for the event, for example Scheduled email upload.
3. Set the **Priority** — high, normal or low.

## Events

4. Set the **Activation Time** parameters (24h clock) for the event. For example, select **Recurrence pattern** and let the event start on Sundays at 13.00 with a duration of 12 hours.
5. Set the **When Activated** parameters, that is, define what the product should do when motion is detected. To upload images, select **Save stream** and enter the required information. See *Save stream*.
6. Click **OK** to save the event.

### Save stream

To upload images to an FTP or HTTP server, save the video stream to the SD card or send images by email, check the **Save stream box**.

Pre-trigger and post-trigger buffers are useful when checking to see what happened immediately before and after a trigger. All uploaded images are JPEG images.

**Image frequency –** Set the image frequency to a desired frame rate. The frame rate will be the best possible, but might not be as high as specified, especially if uploading via a slow connection.

**Include pre-trigger buffer –** Images stored internally in the product from the time immediately preceding the trigger. Check the box to enable the pre-trigger buffer and specify the buffer length in seconds, minutes or hours.

**Include post-trigger buffer –** Images stored internally in the product from the time immediately after the trigger. Check the box to enable the post-trigger buffer and specify the buffer length in seconds, minutes or hours.

Note

- Pre-trigger and post-trigger buffers will be lost if the connection to the event server fails.
- The maximum length of the pre-/post-trigger buffer depends on the video image size and selected frame rate.
- If the pre- or post-buffer is too large for the product's internal memory, the frame rate is reduced and individual images may be missing. If this occurs, an entry is created in the product's log file.

**Continue image upload (unbuffered) –** Upload video images for a fixed length of time or for as long as the trigger is active.

**Select type –** Upload images to an FTP or HTTP server, send images by email or save the video stream to the SD card.

**Create folder –** Images uploaded to FTP and HTTP servers can be saved to designated folders. Folders can, for example, be named using the current date and time, see *File Naming & Date/Time Formats* in the online help.

**Base file name –** Used to name all uploaded images. Add a suffix or use your own file format to give the images unique names, see *File Naming & Date/Time Formats* in the online help.

**Use stream profile –** Select the stream profile to upload, send as email or save to the SD card. When saving to the SD card, the video format must first be selected. For information on stream profiles, see *Stream Profiles, on page 15*.

## Gatekeeper

The Gatekeeper monitors an area such as an entrance gate. It can pan, tilt and zoom in, and take a snapshot of, for example, a face, triggered by movement in the area. The camera will then automatically return to the home position and continue to overview the monitored area.

To configure the Gatekeeper, follow the online instructions under **Events > Gatekeeper**.

## Motion detection

Motion detection is used to generate an alarm whenever movement occurs (or stops) in the view. Up to 10 Include and Exclude windows can be configured:

- **Include windows** – target specific areas within the whole video image

## Events

- **Exclude windows** – define areas within an Include window that should be ignored (areas outside Include windows are automatically ignored)

Once configured, the motion detection windows appear in the list of available triggers for triggered events. See *Set up a triggered event, on page 25*.

Note

Using the motion detection feature may decrease the product's overall performance.

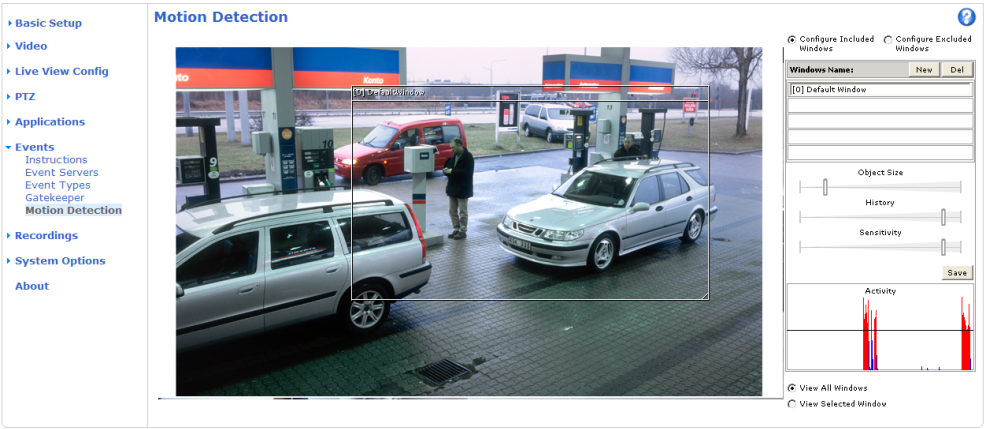
### Set up motion detection

To set up a motion detection Include Window, follow these instructions:

1. Go to **Events > Motion Detection**.
2. Select the **Configure Included Windows** option and click **New**. Select the new window in the list of windows and enter a descriptive name.
3. Adjust the size (drag the bottom right-hand corner) and the position (click on the text at the top and drag to the desired position) of the active window (window with red frame).
4. Adjust the **Object Size**, **History** and **Sensitivity** profile sliders (see *Motion detection parameters* for details). Any detected motion within an active window is indicated by red peaks in the **Activity window**.
5. Click **Save**.

To exclude parts of the include window, select the **Configure Excluded Windows** and position the exclude window within the include window.

To delete an include or exclude window, select the window in the list of windows and click **Del**.




### Motion detection parameters

The parameters controlling motion detection are described in the table below:

| Parameter | Object Size | History | Sensitivity |
|---|---|---|---|
| **Description** | Object size relative to window size. | Object memory length. | Difference in luminance between background and object. |

## Events

| | | | |
|---|---|---|---|
| **High level (100%)** | Only very large objects trigger motion detection. | An object that appears in the window triggers motion detection for a long time before it is considered as non-moving. | Ordinary colored objects on ordinary backgrounds trigger motion detection. |
| **Medium level (50%)** | | | A large difference in luminance is required to trigger motion detection. |
| **Low level (0%)** | Even very small objects trigger motion detection. | An object that appears in the window triggers motion detection only for a very short time before it is considered as non-moving. | Only very bright objects on a dark background trigger motion detection. |
| **Recommended values** | 5–15% | 60–90% | 75–95% |
| **Default values** | 15% | 90% | 90% |

Tips:

- To trigger on small objects or movements, use several small motion detection windows rather than one large window and select a low object size.
- To avoid triggering on small objects, select a high object size.
- If no objects should appear in the Include Window, select a high history level. This will cause motion detection to trigger as long as the object is present in the window.
- To only detect flashing light, select a low sensitivity. In other cases high sensitivity is recommended.

# Recordings

## Recordings

If using an SD card, the Axis product can be configured to record video continuously or as a result of a triggered or scheduled event:

- To start a continuous recording, see *page 30*.
- To set up triggered and scheduled events, see *Events, on page 24*.
- To access event recordings, see *page 29*.

## Event recordings

Event recordings made to the product's SD card (not included) can be accessed from the **Recordings > Events** page. For instructions how to set up triggered and scheduled events, see *Events, on page 24*.

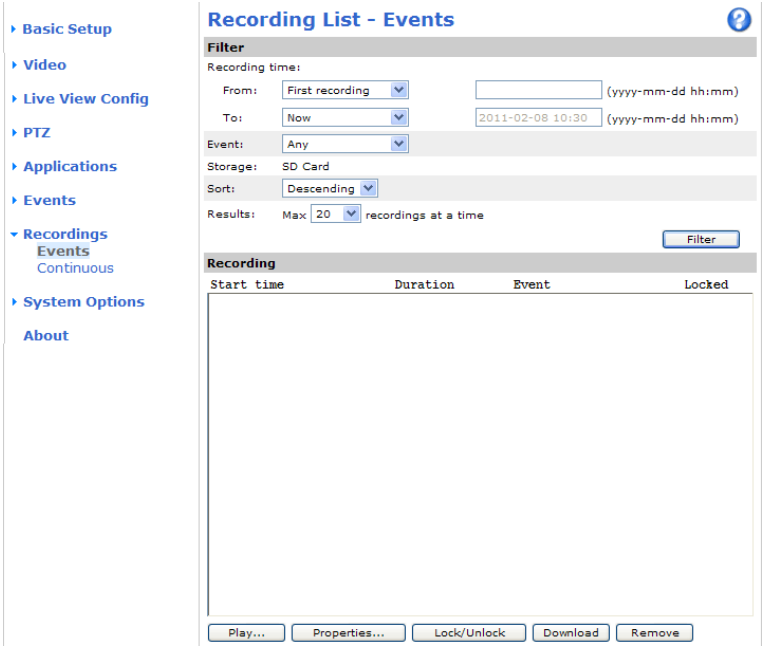
From the **Recordings > Events** page, you can:

- **Play** recordings from the SD card
- View information on the recording, click **Properties**
- **Lock** recordings to prevent accidental removal
- **Remove** recordings
- **Download** recordings

Multiple recordings can be downloaded at the same time. Select the recordings and click **Download**. The downloaded file is a zip file containing a minimum of three files, of which the Matroska (mkv) files are the actual recordings. The recordings are time-stamped with the date and time they were downloaded (that is, not the date the recordings were made).

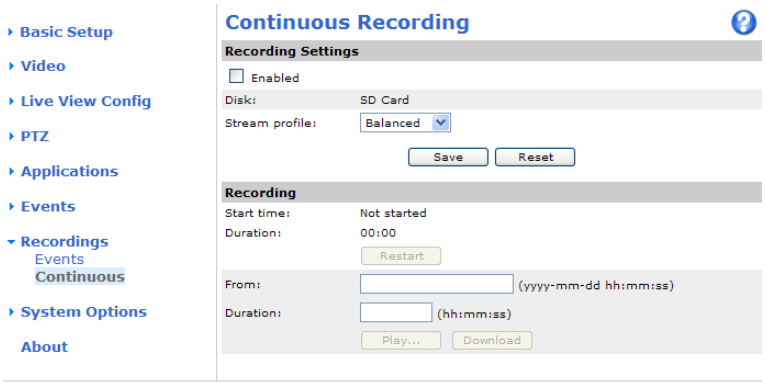
Note

To play recordings in Windows Media Player, AXIS Matroska File Splitter must be installed. AXIS Matroska File Splitter can be downloaded from www.axis.com/techsup/software



# Recordings

## Continuous recording




If using an SD card, the Axis product can be configured to continuously save video to the card. To prevent the disk from becoming full, it is recommended to enable **automatic disk cleanup** under **System Options > Storage**.

To start a continuous recording, follow these steps:

1. Go to **Recordings > Continuous**.
2. Select **Enabled**.
3. Select a **Stream profile** to use for continuous recordings.
4. Click **Save** to save and start the recording.

Note

An ongoing recording will be restarted and all previous continuous recordings will be removed if a new stream profile is selected.

To restart an ongoing recording, go to **Recordings > Continuous** and click **Restart**. This will remove all previous continuous recordings.

To play or download a continuous recording, follow these steps:

1. Go to **Recordings > Continuous**.
2. To play or download the recording from a point in time, enter the year, month, date and the time in hours and minutes in the **From** field.
3. Enter the amount of the recording (hours and minutes) to play or download in the **Duration** field.
4. Click **Play** to playback the recording, or click **Download** to download the recording.

Multiple recordings can be downloaded at the same time. Select the recordings and click **Download**. The downloaded file is a zip file containing a minimum of three files, of which the Matroska (mkv) files are the actual recordings. The recordings are time-stamped with the date and time they were downloaded (that is, not the date the recordings were made).

Note

To play recordings in Windows Media Player, AXIS Matroska File Splitter must be installed. AXIS Matroska File Splitter can be downloaded from www.axis.com/techsup/software

# System Options

## System Options

### Security

#### Users

User access control is enabled by default and can be configured under **System Options > Security > Users**. An administrator can set up other users by giving them user names and passwords. It is also possible to allow anonymous viewer login, which means that anybody may access the Live View page.

The user list displays authorized users and user groups (access levels):

**Viewer –** Access to the Live View page

**Operator –** Access to the Live View page and to all settings except System Options

**Administrator –** Unrestricted access to all settings; can add, modify and remove other users.

Under **HTTP/RTSP Password Settings**, select the type of password to allow. You may need to allow unencrypted passwords if there are viewing clients that do not support encryption, or if you upgraded the firmware and existing clients support encryption but need to log in again and be configured to use this functionality.

Under **User Settings**, check the box to enable **anonymous viewer login** to allow anonymous users access to the Live View page.

Check the box to enable **anonymous PTZ control login** to allow anonymous users access to the PTZ controls.

Uncheck the box **Enable Basic Setup** to hide the Basic Setup menu. Basic Setup provides quick access to settings that should be made before using the Axis product.

#### IP Address Filter

IP address filtering is enabled on the **System Options > Security > IP Address Filter** page. Once enabled, the listed IP address are allowed or denied access to the Axis product. Select **Allow** or **Deny** from the list and click **Apply** to enable IP address filtering.

The administrator can add up to 256 IP address entries to the list (a single entry can contain multiple IP addresses). The users from these IP addresses need to be specified in the user list with the appropriate access rights. See **System Options > Security > Users**.

#### HTTPS

The Axis product supports encrypted browsing using HTTPS. This is configured on the **System Options > Security > HTTPS** page.

A **self-signed certificate** can be used until a Certificate Authority-issued certificate has been obtained. Click **Create self-signed certificate** to install a self-signed certificate. Although self-signed certificates are free and offer some protection, true security is only implemented after the installation of a signed certificate issued by a Certificate Authority.

To obtain a signed certificate from an issuing Certificate Authority, click **Create Certificate Request**. When the signed certificate is returned, click **Install signed certificate** to import the certificate. The properties of any certificate request currently resident in the product or installed can be viewed by clicking **Properties**.

To enable HTTPS in the Axis product, the **HTTPS Connection Policy** must be set for each user group.

For more information, see the online help .

#### IEEE 802.1X

IEEE 802.1X is a standard for port-based Network Admission Control providing secure authentication of wired and wireless network devices. IEEE 802.1X is based on EAP (Extensible Authentication Protocol).

## System Options

To access a network protected by IEEE 802.1X, devices must authenticate themselves. The authentication is performed by a third-party entity called an authentication server, typically a **RADIUS server**, examples of which are FreeRADIUS and Microsoft Internet Authentication Service.

In Axis' implementation, the network device and the authentication server authenticate themselves with the help of digital certificates using EAP-TLS (Extensible Authentication Protocol - Transport Layer Security). The certificates are provided by an **Certification Authority** (CA). You need:

- a CA certificate to validate the identity of the authentication server
- a CA-signed client certificate and a private key to authenticate the network device.

To allow the network device to access a network protected by IEEE 802.1X:

1. Obtain a CA certificate, a client certificate and a client private key (contact your network administrator).
2. Go to **Setup > System Options > Security > IEEE 802.1X** and upload the CA certificate, the client certificate and the client private key.
3. Under **Settings**, select the EAPOL version, provide your EAP identity and private key password.
4. Check the box to enable IEEE 802.1X and click **Save**.

**Certificates**

| | |
|---|---|
| CA Certificate | The CA certificate is used to validate the identity of the authentication server. Enter the path to the certificate directly, or locate the file using the **Browse** button. Then click **Upload**. To remove a certificate, click **Remove**. |
| **Client certificate**<br>**Client private key** | The client certificate and private key are used to authenticate the network device. They can be uploaded as separate files or in one combined file (e.g. a PFX file or a PEM file). Use the **Client private key** field if uploading one combined file. For each file, enter the path to the file, or locate the file using the **Browse** button. Then click **Upload**. To remove a file, click **Remove**. |

**Settings**

| | |
|---|---|
| **EAPOL version** | Select the EAPOL version (1 or 2) as used in your network switch. |
| **EAP identity** | Enter the user identity (maximum 16 characters) associated with your certificate. |
| **Private key password** | Enter the password (maximum 16 characters) for the private key. |
| **Enable IEEE 802.1X** | Check the box to enable the IEEE 802.1X protocol. |

## Date & Time

The Axis product's date and time settings are configured under **System Options > Date & Time**.

**Current Server Time** displays the current date and time (24h clock). The time can be displayed in 12h clock in the text overlay (see below).

To change the date and time settings, select the preferred **Time mode** under **New Server Time**:

- **Synchronize with computer time** sets date and time according to the computer's clock. With this option, date and time are set once and will not be updated automatically.
- **Synchronize with NTP Server** obtains date and time from an NTP server. With this option, date and time settings are updated every 60 minutes. For information on NTP settings, see *NTP Configuration, on page 34*.

  If using a host name for the NTP server, a DNS server must be configured. See *DNS Configuration, on page 34*.
- **Set manually** allows you to manually set date and time.

# System Options

If using an NTP server, select your **Time zone** from the drop-down list. If required, check **Automatically adjust for daylight saving time changes**.

The **Date & Time Format Used in Images** is the date and time format displayed as a text overlay in the video stream. Use the predefined formats or see *File Naming & Date/Time Formats* in the online help for information on how to create custom date and time formats. To include date and time in the overlay text, go to **Video** and select **Include date** and **Include time**.

## Network

### Basic TCP/IP Settings

The Axis product supports IP version 4 and IP version 6. Both versions can be enabled simultaneously, and at least one version must always be enabled.

#### IPv4 Address Configuration

By default, the Axis product is set to use IPv4 (IP version 4) and to obtain the IP address automatically via DHCP. The IPv4 settings are configured under **System Options > Network > TCP/IP > Basic**.

DHCP (Dynamic Host Configuration Protocol) allows network administrators to centrally manage and automate the assignment of IP addresses. DHCP should only be enabled if using dynamic IP address notification, or if the DCHP can update a DNS server, which when allows you to access the Axis product by name (host name).

If DHCP is enabled and the product cannot be accessed, run AXIS IP Utility to search the network for connected Axis products, or reset the product to the factory default settings (see *page 39*) and then perform the installation again.

To use a static IP address, check **Use the following IP address** and specify the IP address, subnet mask and default router.

#### IPv6 Address Configuration

If IPv6 (IP version 6) is enabled, the Axis product will receive an IP address according to the configuration in the network router.

To enable IPv6, go to **System Options > Network > TCP/IP > Basic**. Other settings for IPv6 should be configured in the network router.

#### ARP/Ping

The IP address can be set using ARP and Ping. For instructions, see the product's Installation Guide.

ARP/Ping is enabled by default. To disable, uncheck the box under **System Options > Network > TCP/IP > Basic**.

The ARP/Ping service is automatically disabled two minutes after the product is started, or as soon as an IP address is set. To reset the IP address, the product must be restarted to activate ARP/Ping for an additional two minutes.

Pinging the product is still possible when this service is disabled.

#### AXIS Video Hosting System (AVHS)

AVHS used in conjunction with an AVHS service, provides easy and secure Internet access to live and recorded video accessible from any location. For more information and help to find a local AVHS Service Provider go to www.axis.com/hosting

AVHS is enabled by default. The settings are configured under **System Options > Network > TCP IP > Basic**.

**One-click enabled –** Press the product's control button (see *Hardware overview, on page 4*) to connect to an AVHS service over the Internet. Once registered, **Always** will be enabled and the Axis product stays connected to the AVHS service. If the product is not registered within 24 hours from when the button is pressed, the product will disconnect from the AVHS service.

**Always –** The Axis product will constantly attempt to connect to the AVHS service over the Internet. Once registered the product will stay connected to the service. This option can be used when the product is already installed and it is not convenient to use the one-click installation.

## System Options

#### AXIS Internet Dynamic DNS Service

AXIS Internet Dynamic DNS Service assigns a host name for easy access to the product. For more information, see www.axiscam.net

To register the Axis product with AXIS Internet Dynamic DNS Service, go to **System Options > Network > TCP/IP > Basic**. Under **Services**, click the AXIS Internet Dynamic DNS Service **Settings** button (requires access to the Internet). The domain name currently registered at AXIS Internet Dynamic DNS service for the product can at any time be removed.

### Advanced TCP/IP Settings

#### DNS Configuration

DNS (Domain Name Service) provides the translation of host names to IP addresses. The DNS settings are configured under **System Options > Network > TCP/IP > Advanced**.

Select **Obtain DNS server address via DHCP** to use the DNS settings provided by the DHCP server.

To make manual settings, select **Use the following DNS server address** and specify the following:

**Domain name –** Enter the domain(s) to search for the host name used by the Axis product. Multiple domains can be separated by semicolons. The host name is always the first part of a fully qualified domain name, for example, `myserver` is the host name in the fully qualified domain name `myserver.mycompany.com` where `mycompany.com` is the domain name.

**Primary/Secondary DNS server –** Enter the IP addresses of the primary and secondary DNS servers. The secondary DNS server is optional and will be used if the primary is unavailable.

#### NTP Configuration

NTP (Network Time Protocol) is used to synchronize the clock times of devices in a network. The NTP settings are configured under **System Options > Network > TCP/IP > Advanced**.

Select **Obtain NTP server address via DHCP** to use the NTP settings provided by the DHCP server.

To make manual settings, select **Use the following NTP server address** and enter the host name or IP address of the NTP server.

#### Host Name Configuration

The Axis product can be accessed using a host name instead of an IP address. The host name is usually the same as the assigned DNS name. The host name is configured under **System Options > Network > TCP/IP > Advanced**.

Select **Obtain host name via IPv4 DHCP** to use host name provided by the DHCP server running on IPv4.

Select **Use the host name** to set the host name manually.

Select **Enable dynamic DNS updates** to dynamically update local DNS servers whenever the Axis product's IP address changes.

For more information, see the online help .

#### Link-Local IPv4 Address

**Link-Local Address** is enabled by default and assigns the Axis product an additional IP address which can be used to access the product from other hosts on the same segment on the local network. The product can have a Link-Local IP and a static or DHCP-supplied IP address at the same time.

This function can be disabled under **System Options > Network > TCP/IP > Advanced**.

#### HTTP

The HTTP port used by the Axis product can be changed under **System Options > Network > TCP/IP > Advanced**. Any port in the range 1024–65536 can be used. The default setting is 80.

## System Options

### HTTPS

The HTTPS port used by the Axis product can be changed under **System Options > Network > TCP/IP > Advanced**. Any port in the range 1024–65536 can be used. The default setting is 443.

To enable HTTPS, go to **System Options > Security > HTTPS**. For more information, see *page 31*.

### NAT traversal (port mapping) for IPv4

A network router allows devices on a private network (LAN) to share a single connection to the Internet. This is done by forwarding network traffic from the private network to the "outside", that is, the Internet. Security on the private network (LAN) is increased since most routers are pre-configured to stop attempts to access the private network (LAN) from the public network (Internet).

Use **NAT traversal** when the Axis product is located on an intranet (LAN) and you wish to make it available from the other (WAN) side of a NAT router. With NAT traversal properly configured, all HTTP traffic to an external HTTP port in the NAT router is forwarded to the product.

NAT traversal is configured under **System Options > Network > TCP/IP > Advanced**.

Note

- For NAT traversal to work, this must be supported by the router. The router must also support UPnP™.
- The router has many different names: "NAT router", "Network router", "Internet Gateway", "Broadband router", "Broadband sharing device" or "Home firewall" but the essential purpose of the device is the same.

**Enable/Disable –** When enabled, the Axis product attempts to configure port mapping in a NAT router on your network, using UPnP™. Note that UPnP™ must be enabled in the product (see **System Options > Network > UPnP**).

**Use manually selected NAT router –** Select this option to manually select a NAT router and enter the IP address for the router in the field. If no router is specified, the product automatically searches for NAT routers on your network. If more than one router is found, the default router is selected.

**Alternative HTTP port –** Select this option to manually define an external HTTP port. Enter the port number in the field. If no port is entered here, a port number is automatically selected when NAT traversal is enabled.

Note

- An alternative HTTP port can be used or be active even if NAT traversal is disabled. This is useful if your NAT router does not support UPnP and you need to manually configure port forwarding in the NAT router.
- If you attempt to manually enter a port that is already in use, another available port is automatically selected.
- When the port is selected automatically it is displayed in this field. To change this, enter a new port number and click **Save**.

### FTP

The FTP server running in the Axis product enables upload of new firmware, user applications, etc. The FTP server can be disabled under **System Options > Network > TCP/IP > Advanced**.

Note

This FTP server has nothing to do with the product's ability to transfer images via FTP to other locations and servers.

### RTSP

The RTSP server running in the Axis product allows a connecting client to start an H.264 stream. The RTSP port number can be changed under **System Options > Network > TCP/IP > Advanced**. The default port is 554.

Note

H.264 video streams will not be available if the RTSP server is disabled.

# System Options

## SOCKS

SOCKS is a networking proxy protocol. The Axis product can be configured to use a SOCKS server to reach networks on the other side of a firewall or proxy server. This functionality is useful if the Axis product is located on a local network behind a firewall, and notifications, uploads, alarms, etc need to be send to a destination outside the local network (for example the Internet).

SOCKS is configured under **System Options > Network > SOCKS**. For more information, see the online help .

## QoS (Quality of Service)

QoS (Quality of Service) guarantees a certain level of a specified resource to selected traffic on a network. A QoS-aware network prioritizes network traffic and provides a greater network reliability by controlling the amount of bandwidth an application may use.

The QoS settings are configured under **System Options > Network > QoS**. Using DSCP (Differentiated Services Codepoint) values, the Axis product can mark the following types of traffic: live video, event/alarm traffic and management traffic.

## SMTP (email)

To send event and error email messages from the Axis product via SMTP (Simple Mail Transfer Protocol), an SMTP mail server must be set up. This is done under **System Options > Network > SMTP (email)**.

Enter the host names or IP addresses and port numbers for the primary and secondary mail servers in the fields provided. A **From email address** is also required. If the mail server requires authentication, check **Use authentication to log in to this server** and enter the necessary information.

## SNMP

The Simple Network Management Protocol (SNMP) allows remote management of network devices. An SNMP community is the group of devices and management station running SNMP. Community names are used to identify groups.

The Axis product can be configured to support SNMP on the **System Options > Network > SNMP** page.

Depending on the level of security required, select the version on SNMP to use.

**SNMP v1/v2** provides the lowest level of security. The community name can be specified as a password for read or read/write access to all supported SNMP devices. The default password for the **Read community** is public and the default password for the **Write community** is write.

Note

If HTTPS is enabled, SNMP v1 and SNMP v2c should be disabled.

**Traps for SNMP v1/v2** are used by the Axis product to send messages to a management system on important events and status changes. Check **Enable traps** and enter the IP address where the trap message should be sent and the **Trap community** that should receive the message.

The following traps are available:

- Cold start
- Warm start
- Link up
- Authentication failed

**SNMP v3** provides encryption and secure passwords. To use traps with SNMP v3, an SNMP v3 management application is required.

To use SNMP v3, HTTPS must be enabled, see *HTTPS, on page 31*. To enable SNMP v3, check the box and provide the initial user password.

## System Options

Note

The initial password can only be set once. If the password is lost, the Axis product must be reset to factory default, see *Reset to factory default settings, on page 39*.

### UPnP™

The Axis product includes support for UPnP™. UPnP™ is enabled by default and the product is automatically detected by operating systems and clients that support this protocol.

UPnP™ can be disabled under **System Options > Network > UPnP™**.

### RTP/H.264

The RTP port range and multicast settings are configured under **System Options > Network > RTP**.

The RTP port range defines the range of ports from which the video ports are automatically selected. For multicast streams, only certain IP addresses and port numbers should be used.

### Bonjour

The Axis product includes support for Bonjour. Bonjour is enabled by default and the product is automatically detected by operating systems and clients that support this protocol.

Bonjour can be disabled under **System Options > Network > Bonjour**.

## Storage

### SD Card

The SD/SDHC memory card (not included) is managed on the **System Options > Storage > SD Card** page.

The settings under **Storage Device** are used to identify and monitor the status of the SD card, and to **unmount** the SD card before removal. Mounting is done automatically when a card is inserted. SD cards are normally preformatted when purchased, but if needed, click **Format** to format the card.

Note

To prevent corruption of recordings, the SD card should always be unmounted before removal.

If the card's status shows as failed, click **Check disk** to see if the problem can be found and then try **Repair**.

The settings under **Storage Device Settings** are used to configure removal of recorded video. Automatic disk cleanup can be enabled and set according to a schedule. The disk can be locked to prevent removal of recordings.

For more information, see the online help.

## Maintenance

The Axis product provides several maintenance functions. These are available under **System Options > Maintenance**.

Click **Restart** to perform a correct restart if the Axis product is not behaving as expected. This will not affect any of the current settings.

Click **Restore** to reset most settings to the factory default values. The following settings are not affected:

- the boot protocol (DHCP or static)
- the static IP address
- the default router

- the subnet mask
- the system time
- the IEEE 802.1X settings

Click **Default** to reset all settings, including the IP address, to the factory default values. This button should be used with caution. The Axis product can also be reset to factory default using the control button, see *Reset to factory default settings, on page 39*.

To test the product's PTZ mechanics, click **Test** under **PTZ Status**.

For information about firmware upgrade, see *Upgrading the firmware, on page 41*.

## Support

### Support Overview

The **System Options > Support > Support Overview** page provides information on troubleshooting and contact information, should you require technical assistance.

See also *Troubleshooting, on page 41*.

### System Overview

To get an overview of the Axis product's status and settings, go to **System Options > Support > System Overview**. Information that can be found here includes firmware version, IP address, network and security settings, event settings, image settings and recent log items. Many of the captions are links to the proper Setup page.

### Logs & Reports

The **System Options > Support > Logs & Reports** page generates logs and reports useful for system analysis and troubleshooting. If contacting Axis Support, please provide a valid Server Report with your query.

**System Log –** Provides information about system events.

**Access Log –** Lists all failed attempts to access the product. The Access Log can also be configured to list all connections to the product (see below).

**Server Report –** Provides information about the product status in a popup window. The Access Log is automatically included in the Server Report.

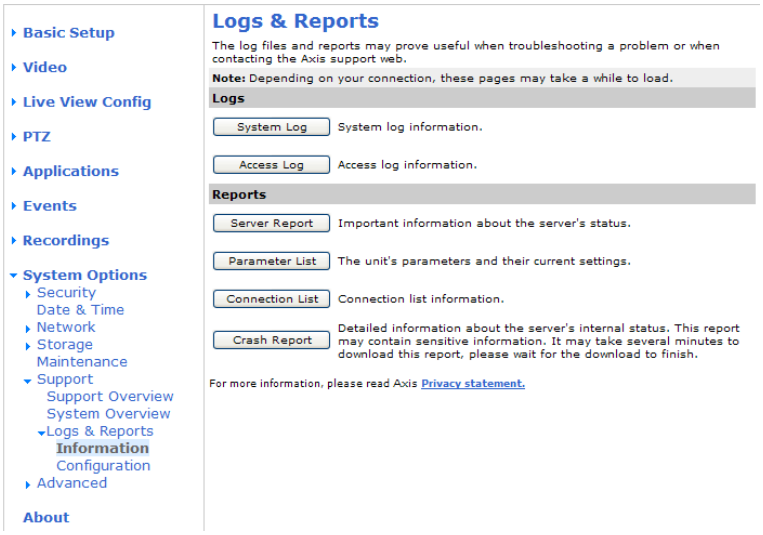
**Parameter List –** Shows the product's parameters and their current settings. This may prove useful when troubleshooting or when contacting Axis Support.

**Connection List –** Lists all clients that are currently accessing media streams.

**Crash Report –** Generates an archive with debugging information. The report takes several minutes to generate.

The log levels for the System Log and the Access Log are set under **System Options > Support > Logs & Reports > Configuration**. The Access Log can be configured to list all connections to the product (select Critical, Warnings & Info). If required, a different log level can be used when sending emails.

# System Options




## Advanced

### Scripting

Scripting allows experienced users to customize and use their own scripts.

**Caution**

Improper use may cause unexpected behavior and loss of contact with the Axis product.

Axis strongly recommends that you do not use this function unless you understand the consequences. Axis Support does not provide assistance for problems with customized scripts.

To open the Script Editor, go to **System Options > Advanced > Scripting**. It is recommended to create a backup file before customizing the scripts. If a script causes problems, reset the product to its factory default settings, see *page 39*.

For more information, see www.axis.com/developer

### File Upload

Files, for example web pages and images, can be uploaded to the Axis product and used as custom settings. To upload a file, go to **System Options > Advanced > File Upload**.

Uploaded files are accessed through `http://<ip address>/local/<user>/<file name>` where `<user>` is the selected user group (viewer, operator or administrator) for the uploaded file.

### Plain Config

Plain Config is for advanced users with experience of Axis product configuration. All parameters can be set and modified from this page. Help is available from the standard help pages.

To open Plain Config, go to **System Options > Advanced > Plain Config**.

## Reset to factory default settings

This will reset all parameters, including the IP address, to the factory default settings:

1. Press and hold the Control button and the Restart button at the same time (see *Hardware overview, on page 4*).

## System Options

2. Release the Restart button but continue to hold down the Control button for about 15 seconds until the Status indicator flashes amber.
3. Release the Control button. The process is complete after about 1 minute (when the Status indicator turns green). The product has been reset to the factory default settings. The default IP address is `192.168.0.90`
4. Re-assign the IP address.

It is also possible to reset parameters to factory default via the web interface. Go to **Setup > System Options > Maintenance**.

## Troubleshooting

### Checking the firmware

Firmware is software that determines the functionality of network devices. One of your first actions when troubleshooting a problem should be to check the current firmware version. The latest version may contain a correction that fixes your particular problem. The current firmware version in the Axis product is displayed in the page **Setup > Basic Setup** and in **Setup > System Options > About**.

### Upgrading the firmware

When you upgrade the product with the latest firmware from Axis website, the product receives the latest functionality available. Always read the upgrade instructions and release notes available with each new release, before upgrading the firmware.

To upgrade, follow these instructions:

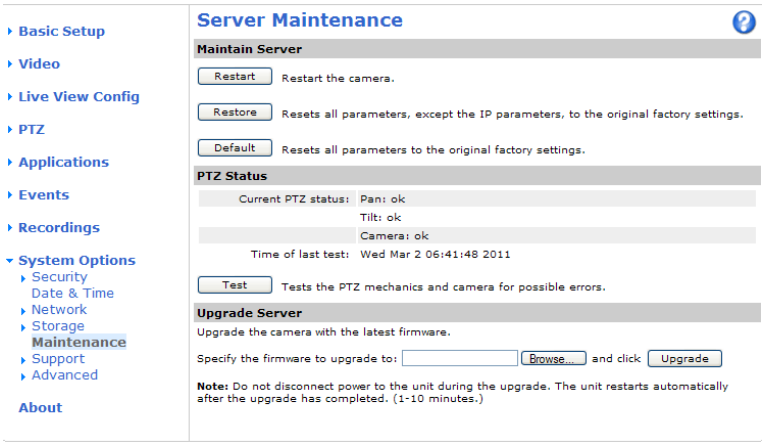
1. Save the firmware file to your computer. The latest version of the firmware is available free of charge from Axis website at www.axis.com/techsup
2. Go to **Setup > System Options > Maintenance** in the products web pages.
3. Under **Upgrade Server**, click **Browse** and locate the file on your computer. Click **Upgrade**.

After starting the upgrade process, always wait at least 5–10 minutes before restarting the product, even if you suspect the upgrade has failed.

AXIS Camera Management can be used for multiple upgrades. See www.axis.com for more information.

Note

- Your dealer reserves the right to charge for any repair attributable to faulty upgrade by the user.
- Preconfigured and customized settings are saved when the firmware is upgraded (providing the features are available in the new firmware) although this is not guaranteed by Axis Communications AB.




### Emergency recovery procedure

If power or network connection is lost during the upgrade, the process fails and the product becomes unresponsive. Flashing red Status indicator indicates a failed upgrade. To recover the product, follow the steps below. The serial number is found on the product's label.

1. In **UNIX/Linux**, type the following from the command line:

   ```
   arp -s <IP address> <serial number> temp
   ```

## Troubleshooting

```
ping -s 408 <IP address>
```

In **Windows**, type the following from a command/DOS prompt:

```
arp -s <IP address> <serial number> temp
ping -l 408 -t <IP address>
```

2. If the product does not reply within a few seconds, restart it and wait for a reply. Press CTRL+C to stop Ping.
3. Open a browser and type in the product's IP address. In the page that appears, use the **Browse** button to select the upgrade file to use. Then click **Load** to restart the upgrade process.
4. After the upgrade is complete (1–10 minutes), the product automatically restarts and shows a steady green on the Status indicator.
5. Reinstall the product, referring to the Installation Guide.

If the emergency recovery procedure does not get the product up and running again, contact Axis support at www.axis.com/techsup/

### Symptoms, possible causes and remedial actions

| | |
|---|---|
| **Problems setting the IP address** | |
| When using ARP/Ping | Try the installation again. The IP address must be set within two minutes after power has been applied to the product. Ensure the Ping length is set to 408. See the Installation Guide for detailed instructions. |
| The product is located on a different subnet | If the IP address intended for the product and the IP address of the computer used to access the product are located on different subnets, you will not be able to set the IP address. Contact your network administrator to obtain an IP address. |
| The IP address is being used by another device | Disconnect the Axis product from the network. Run the Ping command (in a Command/DOS window, type `ping` and the IP address of the product.<br>If you receive: `Reply from <IP address>: bytes=32; time=10...` this means that the IP address may already be in use by another device on the network. Obtain a new IP address from the network administrator and reinstall the product.<br>If you see `Request timed out`, this means that the IP address is available for use with the Axis product. Check all cabling and reinstall the product. |
| Possible IP address conflict with another device on the same subnet. | The static IP address in the Axis product is used before the DHCP server sets a dynamic address. This means that if the same default static IP address is also used by another device, there may be problems accessing the product. |
| **The camera cannot be accessed from a browser** | |
| Cannot log in | When HTTPS is enabled, ensure that the correct protocol (HTTP or HTTPS) is used when attempting to log in. You may need to manually type http or https in the browser's address field. |
| The IP address has been changed by DHCP | If the product and the client are on the same network, run AXIS IP Utility to locate the product. Identify the product using its model or serial number. |
| | Move the Axis product to an isolated network, or to one with no DHCP or BOOTP server. Set the IP address again, using AXIS IP Utility or ARP/Ping (see the Installation Guide). Open the Setup pages and disabled DHCP in the TCP/IP settings. Return the product to the main network. The product now has a fixed IP address that will not change. |
| **The product is accessible locally but not externally** | |
| Router configuration | To configure your router to allow incoming data traffic to the Axis product, enable the NAT-traversal feature which will attempt to automatically configure the router to allow access to the Axis product, see *NAT traversal (port mapping) for IPv4, on page 35*. The router must support UPnP™. |
| Firewall protection | Check the Internet firewall with your network administrator. |
| Default routers requried | Check if you need to configure the router settings. |

## Troubleshooting

| | |
|---|---|
| **Problems with the H.264 format** | |
| No H.264 displayed in the client | Check that the relevant H.264 connection methods and correct interface are enabled in the AMC Control Panel (streaming tab). See *AXIS Media Control (AMC), on page 10*. |
| | In the AMC Control Panel, select the H.264 tab and click **Set to default H.264 decoder**. |
| | Check that RTSP is enabled under **System Options > Network > TCP/IP > Advanced**. |
| No multicast H.264 displayed in the client | Check with your network administrator that the multicast addresses used by the Axis product are valid for your network. |
| | Check with your network administrator to see if there is a firewall preventing viewing. |
| Multicast H.264 only accessible by local clients | Check if your router supports multicasting, or if the router settings between the client and the product need to be configured. The TTL (Time To Live) value may need to be increased. |
| Poor rendering of H.264 images | Color depth set incorrectly on clients. Set to 16–bit or 32–bit color. |
| | If text overlays are blurred, or if there are other rendering problems, you may need to enable Advanced Video Rendering from the Video stab in the AMC Control Panel. |
| | Ensure that your graphics card is using the latest driver. The latest drivers can usually be downloaded from the manufacturer's website. |
| Color saturation is different in H.264 and Motion JPEG | Modify the settings for your graphics adapter. Refer to the adapter's documentation for more information. |
| Lower frame rate than expected | Reduce the number of applications running on the client computer. |
| | Limit the number of simultaneous viewers. |
| | Check with the network administrator that there is enough bandwidth available. |
| | Check in the AMC Control Panel (H.264 tag) that video processing is NOT set to **Decode only key frames**. |
| | Lower the image resolution. |
| Why do I not get 30 frames per second? | See *Performance considerations, on page 47*. |
| | The 50 Hz version of the product supports up to 25 frames per second. |
| Image degeneration | Decrease the GOV length. |
| **Status indicator LED is flashing red and the camera is inaccessible** | |
| A firmware upgrade has been interrupted or the firmware has otherwise been damaged | See *Emergency recovery procedure, on page 41*. |
| **No images displayed on web page** | |
| Problems with AXIS Media Control (Internet Explorer only) | To enable the updating of video images in Internet Explorer, set the browser to allow ActiveX controls. Also, make sure that AXIS Media Control is installed on your workstation. |
| Installation of additional ActiveX component restricted or prohibited | Configure the Axis product to use a Java applet for updating video images in Internet Explorer. Go to **Setup > Live View Config** and select Java applet under **Default viewer**. |
| **Video and image problems, general** | |
| Image too dark or too light | Check the video image settings under **Setup > Video > Video Stream** and **Setup > Video > Camera Settings**. |
| Missing images in uploads | This can occur when trying to use a larger image buffer than is actually available. Try lowering the frame rate or the upload period. |
| Slow image update | Configuring pre-buffers, motion detection, high-resolution images or high frame rates will affect the performance of the Axis product. |

## Troubleshooting

| | |
|---|---|
| Poor performance | Poor performance may be caused by heavy network traffic, multiple users accessing the product, low performance clients, use of features such as motion detection, event handling and image rotation other than 180 degrees. |
| **Poor quality snapshot images** | |
| Screen incorrectly configured on your computer | Configure your screen to show at least 65000 colors, that is, at least 16 bits. Using only 16 or 256 colors will produce dithering artifacts in the image. |
| **Overlay or Privacy Mask is not displayed** | |
| Incorrect size or location of overlay or privacy mask | The overlay or privacy mask may have been positioned incorrectly or may be too large. See *Overlay Image Settings* in the online help for more information. |
| **Browser freezes** | |
| Netcape 7.x and Mozilla 1.4 (or later) can sometimes freeze on a slow computer | Lower the image resolution |
| **Problems uploading files** | |
| Limited space | There is only limited space available for the upload of your own files. Delete existing files to free up space. |
| **Motion Detection triggers unexpectedly** | |
| Changes in luminance | Motion detection is based on changes in luminance in the image. This means that if there are sudden changes in the lighting, motion detection may trigger mistakenly. Lower the sensitivity setting to avoid problems with luminance. |
| **Storage and disk management problems** | |
| Video cannot be recorded | Check that the SD card is not write protected (that is, read only). |
| SD card cannot be mounted | Reformat the SD card and then click Mount. |

# Technical Specifications

## Technical Specifications

| Function/group | Item | Specifications |
|---|---|---|
| | Models | AXIS P5522–E 50 Hz<br>AXIS P5522–E 60 Hz |
| | Image sensor | 1/4" ExView HAD progressive scan CCD |
| | Lens | Varifocal f=4.1 - 73.8 mm, F1.4 - 3.0<br>Autofocus, automatic day/night<br>Horizontal angle of view: 48.0° - 2.8° |
| | Minimum illumination | Color: 0.5 lux at 30 IRE F1.4<br>B/W: 0.01 lux at 30 IRE F1.4 |
| | Shutter time | 1/10000 s to 1 |
| | Pan/Tilt/Zoom | E-flip, Auto-flip, 100 preset positions<br>Pan: 360° (with auto flip) 0.2 – 200°/s<br>Tilt: 180°, 0.2 – 200°/s<br>18x optical zoom and 12x digital zoom, total 216x zoom |
| | Pan/Tilt/Zoom functionalities | Limited guard tour<br>Control queue<br>On-screen directional indicator |
| | Video compression | H.264 (MPEG-4 Part 10/AVC, Baseline profile)<br>Motion JPEG |
| | Resolutions | D1 720x480 to 176x120 (60Hz)<br>D1 720x576 to 176x144 (50Hz) |
| | Frame rate H.264 | Up to 30/25 fps in all resolutions |
| | Frame rate Motion JPEG | Up to 30/25 fps in all resolutions |
| | Video streaming | Multiple, individually configurable streams in H.264 and Motion JPEG<br>Controllable frame rate and bandwidth<br>VBR/CBR H.264 |
| | Image settings | Wide dynamic range (WDR), manual shutter time, compression, brightness, sharpness, white balance, exposure control, exposure zones, backlight compensation, fine tuning of behavior at low light, rotation, aspect ratio correction, text and image overlay, 3D privacy mask, image freeze on PTZ |
| Network | Security | Password protection, IP address filtering, HTTPS* encryption, IEEE 802.1X* network access control, digest authentication, user access log |
| | Supported protocols | IPv4/v6, HTTP, HTTPS*, SSL/TLS*, QoS Layer 3 DiffServ, FTP, SMTP, Bonjour, UPnP, SNMPv1/v2c/v3(MIB-II), DNS, DynDNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS |

## Technical Specifications

| Function/group | Item | Specifications |
|---|---|---|
| System Integration | Application Programming Interface | Open API for software integration, including VAPIX® and Axis Camera Application Platform from Axis Communications; specifications available at www.axis.com Includes the ONVIF specification available at www.onvif.org<br>Support for AXIS Video Hosting System (AVHS) with One-Click Camera Connection |
| | Intelligent video | Video motion detection, Advanced Gatekeeper |
| | Alarm triggers | Video motion detection, AXIS Camera Application Platform, On boot, Fan malfunction, external input, temperature, memory card full |
| | Alarm events | File upload via FTP, HTTP and email Notification via email, HTTP and TCP External output, local storage, run guard tour, PTZ preset |
| | Video buffer | 98 MB pre- and post alarm |
| | Video access from web browser | Camera live view<br>Video recording to file (ASF)<br>Customizable HTML pages<br>Windows 7, Windows Vista, Windows XP, Windows Server 2008, Windows Server 2003<br>DirectX 9c or higher<br>For other operating systems and browsers, see www.axis.com/techsup |
| | Installation, management and maintenance | AXIS Camera Management tool on CD and web-based configuration<br>Configuration of backup and restore<br>Firmware upgrades over HTTP or FTP, firmware available on www.axis.com |
| General | Casing | IP66- and NEMA 4X-rated metal casing (aluminum), acrylic (PMMA) clear dome, sunshield (PC/ASA) |
| | Processor, memory | ARTPEC-3, 256 MB RAM, 128 MB Flash |
| | Power | High Power over Ethernet (High PoE) IEEE 802.3at, max. 30 W AXIS T8123 High PoE Midspan 1-port: 100-240 VAC, max. 37 W |
| | Connectors | RJ-45 10BASE-T/100BASE-TX PoE<br>IP66-rated RJ-45 connector kit included |
| | Local storage | SD/SDHC memory card slot (card not included) |
| | Operating conditions | Temperature: -20 – 50 °C (-4 – 122 °F)<br>Humidity 20 - 80% RH (non-condensing) |
| | Approvals | EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, EN 55024, FCC Part 15 Subpart B Class A,<br>ICES-003 Class A, VCCI Class A, C-tick AS/NZS CISPR 22, EN 60950-1, KCC Class A IEC 60529 IP66, NEMA 250 Type 4X<br>IEC 60721-4-3 Class 4K1, 4C3, 4M3, EN/IEC 60068-2<br>Midspan: EN 60950-1, GS, UL, cUL, CSA CE, FCC, VCCI, CB, KCC, UL-AR |
| | Weight | 2.0 kg (4.4 lb.) |
| | Included accessories | AXIS T8123 High PoE Midspan 1-port, IP66-rated RJ-45 connector kit, clear and smoked dome cover, Installation Guide, CD with User's Manual, recording software, installation and management tools, Windows decoder 1-user license |
| | Video management software (not included) | AXIS Camera Station – Video management software for viewing and recording up to 50 cameras<br>See www.axis.com/products/video/software/ for more software applications via partners |
| | Optional accessories | Video Surveillance Joystick<br>Multi-user decoder license pack |

## Performance considerations

When settings up your system, it is important to consider how various settings and situations will affect performance. Some factors affect the amount of bandwidth (the bit rate) required, others can affect the frame rate, and some affect both. If the load on the CPU reaches its maximum, this will also affect the frame rate.

The following factors are among the most important to consider:

- High image resolution and/or lower compression levels result in larger images. Bandwidth affected.
- Access by large numbers of Motion JPEG and/or unicast H.264 clients. Bandwidth affected.
- Simultaneous viewing of different streams (resolution, compression) by different clients. Effect on frame rate and bandwidth.
- Accessing Motion JPEG and H.264 video streams simultaneously. Frame rate and bandwidth affected.
- Heavy usage of event settings affect the product's CPU load. Frame rate affected.
- Heavy network utilization due to poor infrastructure. Bandwidth affected.
- Viewing on poorly performing client computers lowers perceived performance. Frame rate affected.

User's Manual
AXIS P5522–E PTZ Dome Network Camera
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